UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/765,481 | 01/27/2004 | Paul Shirley | MICS:0117 (02-1051) | 9550 |

7590 04/03/2006

Michael G. Fletcher
Fletcher Yoder
P.O. Box 692289
Houston, TX 77269-2289

| EXAMINER | |
|---|---|
| TOLEDO, FERNANDO L | |
| **ART UNIT** | **PAPER NUMBER** |
| 2823 | |

DATE MAILED: 04/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 10/765,481 | SHIRLEY ET AL. |
| | Examiner | Art Unit |
| | Fernando L. Toledo | 2823 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 8, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolf and Tauber (Silicon Processing for the VLSI Era Volume 1: Process Technology; pp. 429, 434 – 437, 452 and 453).

3. In re claim 1, Wolf in the textbook, Silicon Processing for the VLSI Era Volume 1: Process Technology, discloses (a) soft-baking a substrate coated with a resist at a first temperature for a first predetermined period of time; and (b) after act (a) soft-baking the substrate coated with the resist at a second higher temperature for a second predetermined period of time (Figure 14; page 435 and 437).

4. In re claim 2, Wolf discloses wherein no resist craters are formed (page 436).

5. In re claim 3, Wolf discloses wherein during the first predetermined period of time: the resist hardens (page 436); and the air trapped under the resist does not possess sufficient energy to expand the resist (page 436).

6. In re claim 4, Wolf discloses wherein during the first predetermined period of time: the resist remains fluid (page 436 and 437); air trapped under the resist expands through the resist to the surface; and the resist flows back to its original conformal shape (page 436 and 437).

7. In re claim 5, Wolf discloses wherein the semiconductor wafer is subjected to a temperature in the range of 30 – 90 °C during the first predetermined period of time (Figures 19 and 20, pages 435 and 436).

8. In re claim 6, Wolf discloses wherein the first predetermined period of time is less than 90 seconds (page 437).

9. In re claim 7, Wolf discloses wherein the first predetermined period of time is more than 90 seconds (page 436).

10. In re claim 8, Wolf discloses wherein the higher temperature is in the range of 90 – 150 °C (page 452).

11. In re claim 11, Wolf discloses wherein the second predetermined period of time is more than 90 seconds (page 452).

12. In re claim 12, Wolf discloses a semiconductor wafer comprising a resist layer without craters at the completion of a two-part soft bake of the semiconductor wafer (Figure 14).

## *Claim Rejections - 35 USC § 103*

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf as applied to claims 1 – 7 above.

15. In re claim 9, Wolf discloses wherein the higher temperature is in the range of ~90 °C (page 452). Wolf does not disclose wherein the temperature is 100 – 130 °C.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a higher temperature of 170 – 180 °C, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. In addition, the selection of temperature, its obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious). Note that the specification contains no disclosure of either the critical nature of the claimed temperature ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen temperature ranges or upon another variable recited in a claim, the Applicant must show that the chosen temperature ranges are critical. *In re Woodruf*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

16. In re claim 10, Wolf discloses wherein the second predetermined period of time is 5 – 10 minutes. Wolf does not disclose wherein the second predetermined period of time is less than 90 seconds.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a second predetermined period of time of less than 90 seconds, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. In addition, the selection of time is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious). Note that the specification contains no disclosure of either the critical nature of the claimed time range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen time range or upon another variable recited in a claim, the Applicant must show that the chosen time range is critical. *In re Woodruf,* 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

***Response to Arguments***

17. Applicant's arguments filed 13 January 2006 have been fully considered but they are not persuasive for the following reasons.

18. Applicant contests that Wolf does not teach a two-step soft bake. Examiner respectfully submits that Wolf does teach implicitly a two-step soft bake. This is shown in figure 20(c) in page 437 of the Wolf reference more clearly. The ramp of the IR oven can be construed as being the first soft-bake step as claimed by Applicant since it is in the temperature range and time range claimed by Applicant. The second soft-bake step claimed by Applicant would be the second part of the curve, which is steady at approximately 100°C, which also falls under the claimed range and time frame of Applicant. Therefore, the 35 USC §102(b) and §103(a) rejections stand and are considered proper.

***Conclusion***

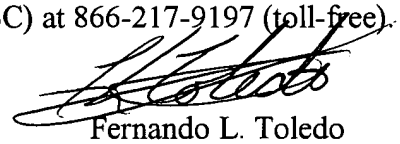
19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Fri 12pm to 7:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fernando L. Toledo
Patent Examiner
Art Unit 2823

flt
22 March 2006